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A PRESUMABLE POTYVIRUS INFECTION OF *STERNBERGIA LUTEA* (L.) KER-G. (*AMARYLLIDACEAE*)

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An aphidborne filamentous virus was isolated from the monocotyledon *Sternbergia lutea* with chlorotic strips on the leaves. The virus provoked cytoplasmic cylindrical inclusions in infected tissue suggesting a potyvirus infection. No virus infection seems to have been recorded in this monocotyledonous plant up to now.

Introduction

A survey of a large list of potyviruses (Milne 1988: 21) shows that a considerable number from among definitive and possible members of the group originates from monocotyledonous natural hosts. Of course, some of them, inadequately characterized as yet, may eventually be recognized as already existing viruses and may become synonymous.

In the Mediterranean plant *Sternbergia lutea* (L.) Ker-G. we have noticed obvious symptoms provoked apparently by a virus inducing cytoplasmic cylindrical inclusions in infected cells. To the best of our knowledge, no virus infection in this monocotyledonous species has been recorded up to now. In this context, the paper represents short information about an infection of *S. lutea* presumably with a potyvirus.

Material and Methods

Sternbergia lutea is a very attractive plant (Fig. 1 A) with a natural spreading area in the west Mediterranean region. In the coastal region of Croatia it grows only as ergasiophygophyton.

Virus symptoms appeared as mild, light green, shorter or longer stripes (Fig. 1 B), which later became more conspicuous. For virus isolation *Chenopodium quinoa* was mechanically inoculated with leaf tissue homogenized in neutral phosphate buffer containing 0.3% sodium ascorbate. This test plant was also used as source of the virus for the determination of test plant host range, for aphid transmission experiments, and the determination of properties of the virus in crude sap.

The aphid transmission experiments were conducted in a non-persistent way, and properties of the virus in plant sap were determined by the common procedure.

For detection of virus particles in leaf extracts, negative staining in 2% sodium phosphotungstate, pH 7.0, was performed. Our standard procedure in preparation of sections (Pleše and Wrischer 1978) was used for ultrastructural observations.

Results and Discussion

After initial isolation of the virus from *S. lutea* to *C. quinoa*, which reacted with systemic chlorotic spotting (Fig. 1 C), the virus was mechanically transmitted to some other experimental species. *C. amaranticolor* and *Nicotiana megalosiphon* reacted with systemic chlorotic and necrotic alterations, respectively, whereas *C. murale, Tetragonia expansa* and *N. glutinosa* developed only local lesions.

The leaf extracts from the symptom bearing *S. lutea* and also from the test plant *C. quinoa* contained a small number of filamentous particles which measured from about 700 to 830 nm in length (Fig. 1 D, E).

A submicroscopical analysis of the leaf tissue of both above mentioned infected species showed a presence of cytoplasmic cylindrical inclusions sectioned at various planes (Fig. 2 A, B, C). This, together with the presence of filamentous particles, suggested a potyvirus infection (Edwardson 1974, Francki et al. 1987, Lesemann 1988, and others). The old infection in *C. quinoa* showed mainly sporadic laminated inclusions (Fig. 2 C). Such decomposition of pinwheels in the late stage of infection is not unknown with potyviruses (Nome et al. 1974). Between cylindrical inclusions single scattered virus particles were also visible in the cytoplasm (Fig. 2 A, B). However, the old infection of *C. quinoa* showed the particles mostly aggregated in bundles (Fig. 2 D). Accumulation and aggregation of virus particles could be more frequently detected in infections with potyviruses (Edwardson 1974, Francki et al. 1987, Lesemann 1988).

The isolated virus was transmissible non-persistently from *C. quinoa* to *C. quinoa* by *Myzus persicae*. Its thermal inactivation point of 68°—72° C, and longevity in sap of 4 days, fall within the range of values quoted for potyviruses (Hollings and Brunt 1981).

On the basis of investigations described, our *S. lutea* was infected with a filamentous virus probably from potyviruses, which, as known, are frequently, encountered in plants. If it is a question of a potyvirus, the isolate from *Sternbergia* may be a member already known in mono-

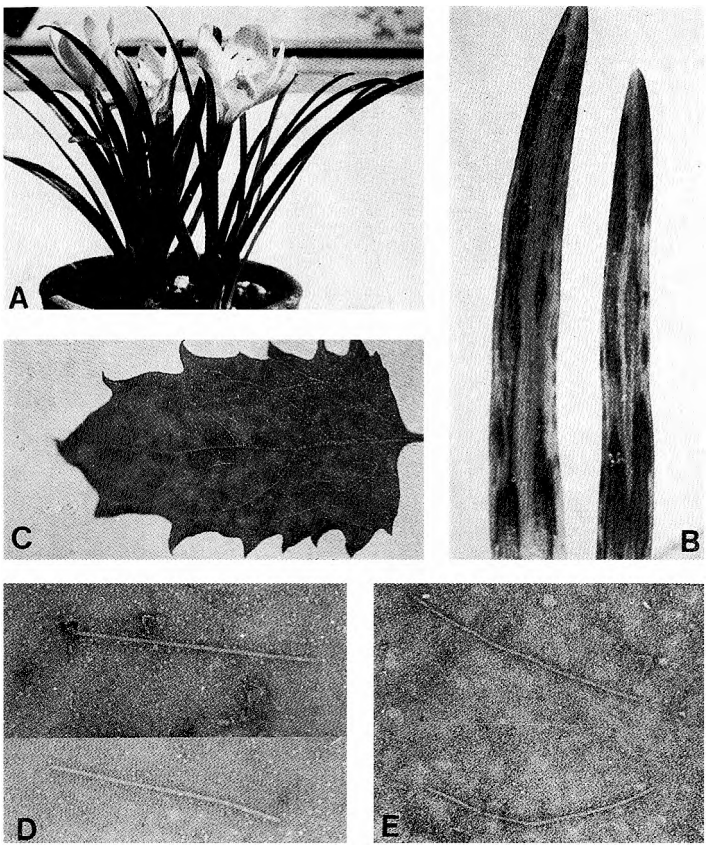

Fig. 1.

▲

Fig. 1. A — *Sternbergia lutea* mother plant; B — chlorotic stripes on the leaves of virus infected *S. lutea;* C — chlorotic mottling on the leaf of *Chenopodium quinoa* systemically infected with the elongated virus from *Sternbergia;* Filamentous virus particles in leaf extracts of infected *S. lutea* (D) and *C. quinoa* (E). 40,000:1.

Fig. 2. Ultrathin sections through *Sternbergia lutea* (A, B) and *Chenopodium quinoa* (C, D) leaf cells infected with the filamentous virus. A, B, C — cytoplasmic cylindrical inclusions sectioned in various planes, appearing as pinwheels (pw), bundles (b) and laminated inclusions (li), and single virus particles (v); D — bundles of virus particles (bv). A, B = 31,000:1, C, D = 40.000:1. ▶

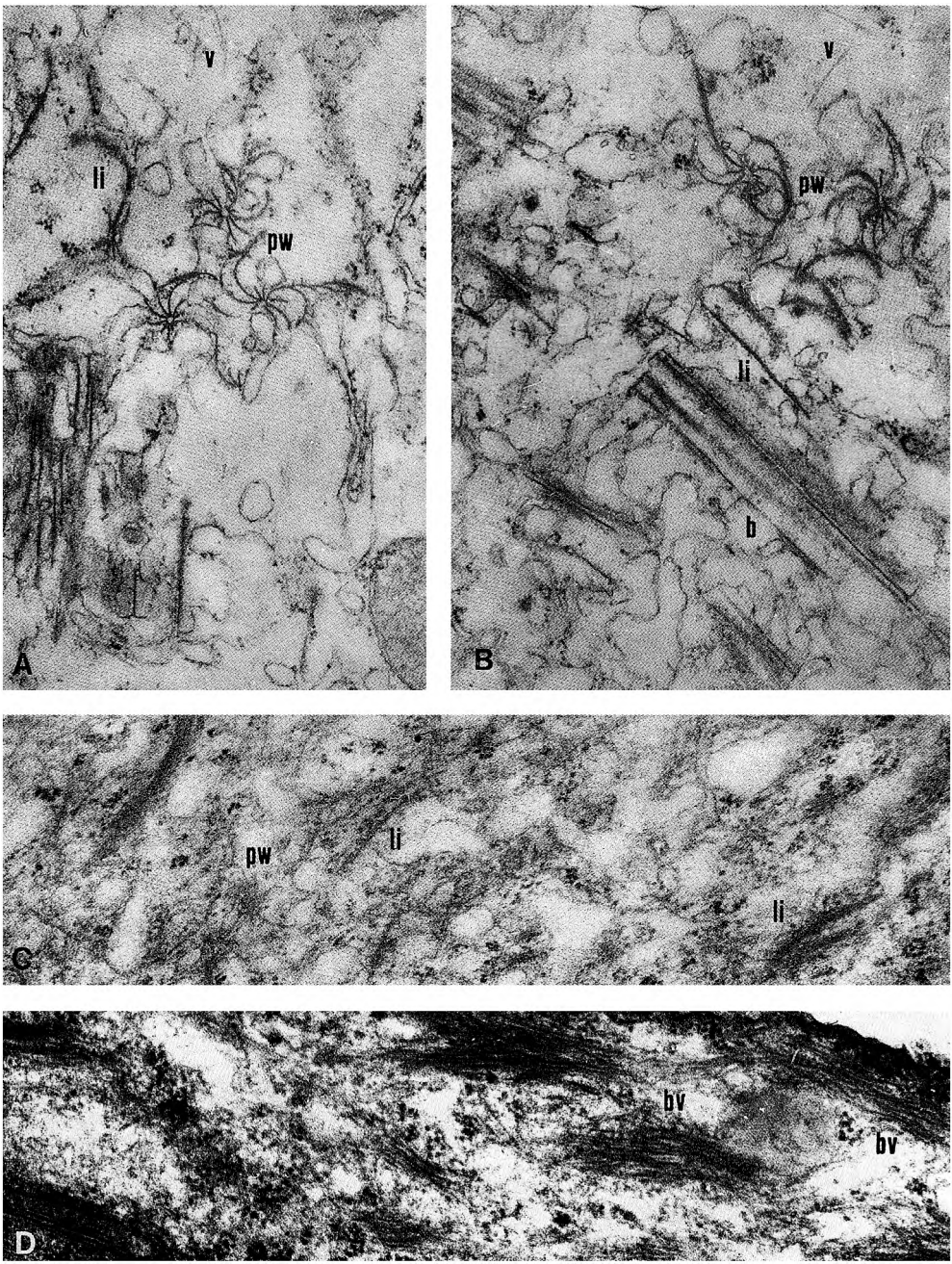

Fig. 2.

cotyledonous or perhaps dicotyledonous plants, or even a new potyvirus. Otherwise, after Mowat et al. (1991) there are also elongated viruses inducing cylindrical inclusions, which are likely to be included in a new virus group.

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SAŽETAK

INFEKCIJA JEDNOSUPNICE *STERNBERGIA LUTEA* (L.) KER-G. — UZROČNIK VJEROJATNO POTYVIRUS

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Iz biljke *Sternbergia lutea* sa simptomima klorotične prugavosti na listovima izoliran je na pokusne biljke produženi virus nitastih čestica koji se prenosi afidima. Virus je u tkivu domaćina uzrokovao pojavu citoplazmatskih cilindričnih virusnih uklopina, što je upozoravalo na zarazu potyvirusom. Prema našem saznanju dosad na navedenoj jednosupnici nije zabilježena virusna infekcija.

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